Sustainable Urban Development Workshop

"DEVELOP Internship Program for Earth Science"

11:10 AM

NASA Ames Research Center

Building 3

January 10, 2009

DEVELOP at Ames Research Center

Mentors: Dr. Jay Skiles, SGE/ARC NASA
Cindy Schmidt, SJSU, SGE/ARC NASA

- DEVELOP started in 1998 at Langley Research Center
- Expanded to Ames Research Center in 2003
- "Student Run, Student Lead"
- Human Capital Development

ARC DEVELOP Interns, Summer 2006

NASA HQ, Science Mission Directorate, Earth Science Division, Applied Science Program

Ames DEVELOP Projects 2003-2007

Year	State	Title
2003	NV	Monitoring Tall Whitetop on the Pyramid Lake Paiute Reservation
	CA	West Nile Virus in Monterey County
2004	NV	Assessing Tamarisk Infestation in Nevada
	OR	Forest Carbon Sequestration In the National Forests
2005	CA	Yosemite Fire Recovery
	UT	Assessing Cheatgrass Infestation in Utah
	CA	Detecting Waste Tires
2006	CA	Yosemite Vegetation Anomalies
	NV	Monitoring Red Brome Infestation
	AK	Assessing Sea Ice Suitability for Walrus
2007	HI	Integrating NASA data for Pacific Rim storms
	CA	Assessing MODIS Leaf Area Index in Yosemite NP
	CA	Determining San Joaquin Valley Air Quality

Ames DEVELOP Team's 2008 Projects

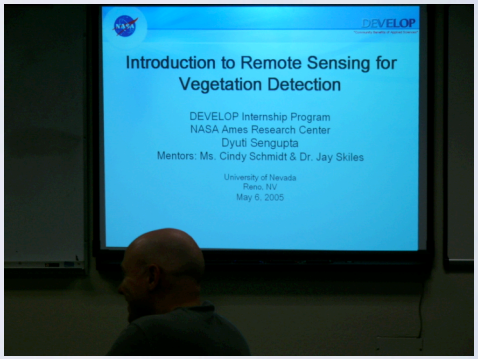
- **Tripod Fire** – Determining carbon sequestration budgets by forests in Eastern Washington before and after wildfire using NASA satellite data, addressing timber harvesting levels and fuel loads prior to the fire, and comparing those with vegetation regrowth.
- **Air Quality** – Assessing Aerosols and Ozone in the Central Valley of California partnered with California Air Resources Board and EPA, using MODIS, MISR and CALIPSO sensors and AERONET and EPA ground monitoring stations, hand-held sun photometer field collection.
- **Cache County**, UT – Total Observation and Prediction System (TOPS) Utah Water Management.
- **Biological Control** – Assessing the extent of biological control exhibited by a non-native beetle on the invasive species Tamarisk (Salt Cedar) in Dinosaur National Monument in Utah.
- **PRICIP** – Pacific Rim Integrated Climatology and Information Products: Studying the Anatomies of severe storm events in the Pacific Rim, in particular, winds, rain, and ocean height with socio-economic data.

DEVELOP Program Objectives

Program Objectives:

Upon completion of the term, each student will:

- Understand NASA Applied Sciences capabilities and NASA's role in the study of Earth Science.
- Have utilized NASA Applied Sciences data to address community issues and demonstrate how NASA science and technology could potentially Improve policy and decision-making.
- Gain a working knowledge of remote sensing, GIS, and data visualization applications
- Work in a professional manner in a team environment



DEVELOP Program Goals

Program Goals:

Bridge the gap between NASA Applied Sciences data and the general public by:

- Creating rapid prototype applications projects that use NASA Applied Sciences data to communicate how NASA information could effect policy and decision making
- Demonstrating the importance of NASA Applied Sciences technology to localities through high level outreach of pilot applications

Provide professional business development experience

Ames Research Center

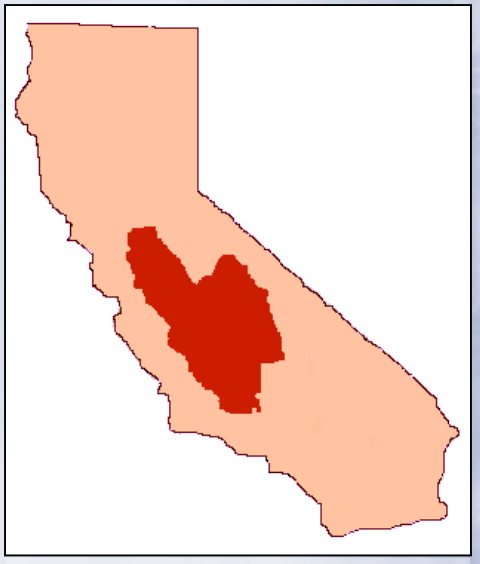
Investigating Correlations Between Satellite-derived Aerosol Optical Depth and Ground $PM_{2.5}$ Measurements in California's San Joaquin Valley with MODIS Deep Blue

Erin Justice, California State University Monterey Bay
Laura Huston, Santa Clara University
David Krauth, University of California Berkeley
Jimmy Mack, University of Arizona
Siddhartha Oza, Stanford University

Science Advisors: Dr. Anthony W. Strawa, Marion Legg, & Dr. Jennifer Dungan
Mentors: Dr. Jay Skiles & Cindy Schmidt
NASA Ames Research Center

SJV Air Pollution

- Sources of pollution include:
  - Local agriculture
  - Atmospheric drift (local, global)
  - Automobile exhaust
- Consequences:
  - Local and regional public health disparities
  - Altered radiation budget



San Joaquin Valley Air Pollution Control District in California

Air Quality in Fresno, CA on June 24, 2008

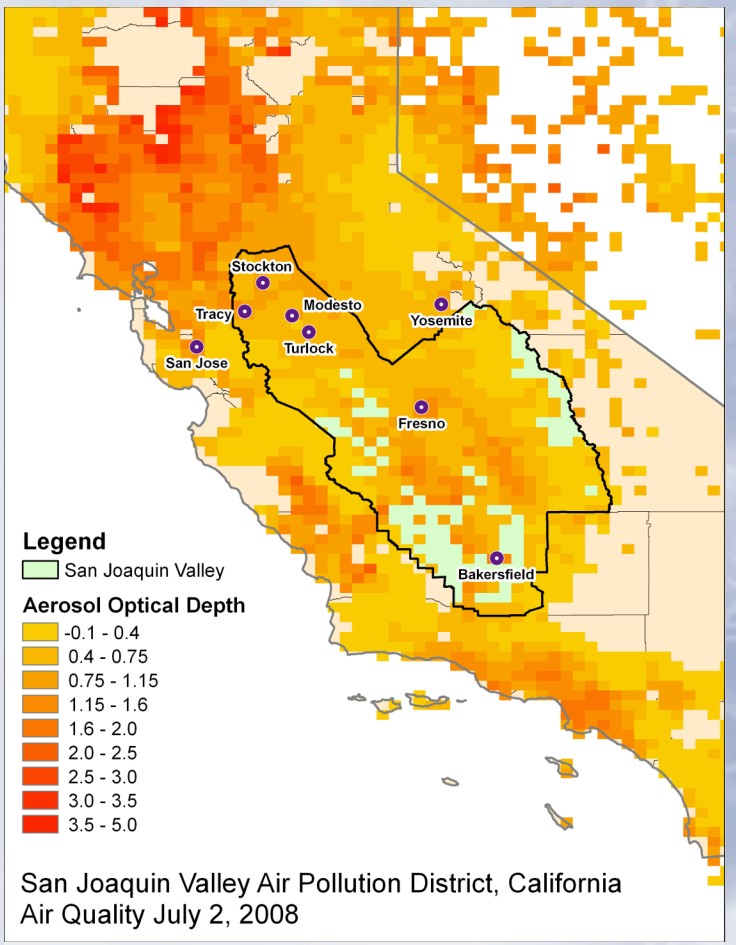
Project Partners

- Environmental Protection Agency (EPA)
- California Air Resources Board (CARB)
- San Joaquin Valley Air Pollution Control District

Annual $PM_{2.5}$ Standards ($\mu g/m^3$)	
Federal	**State**
15	12

Air Quality Monitoring

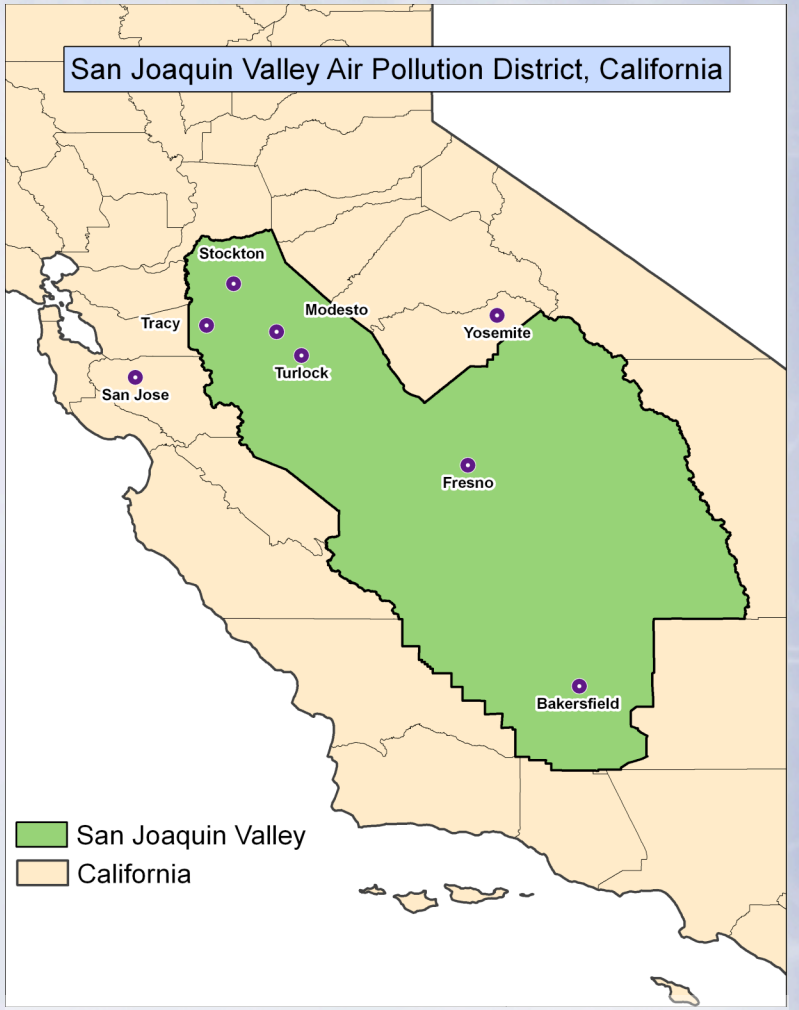
- Particulate Matter (PM)
  - $PM_{2.5}$
  - Mass measurement
- Aerosol optical depth (AOD)
  - Fraction of incident light lost



Map of the San Joaquin Air Pollution Control District in California highlighting the coverage provided by ground sites and satellites.

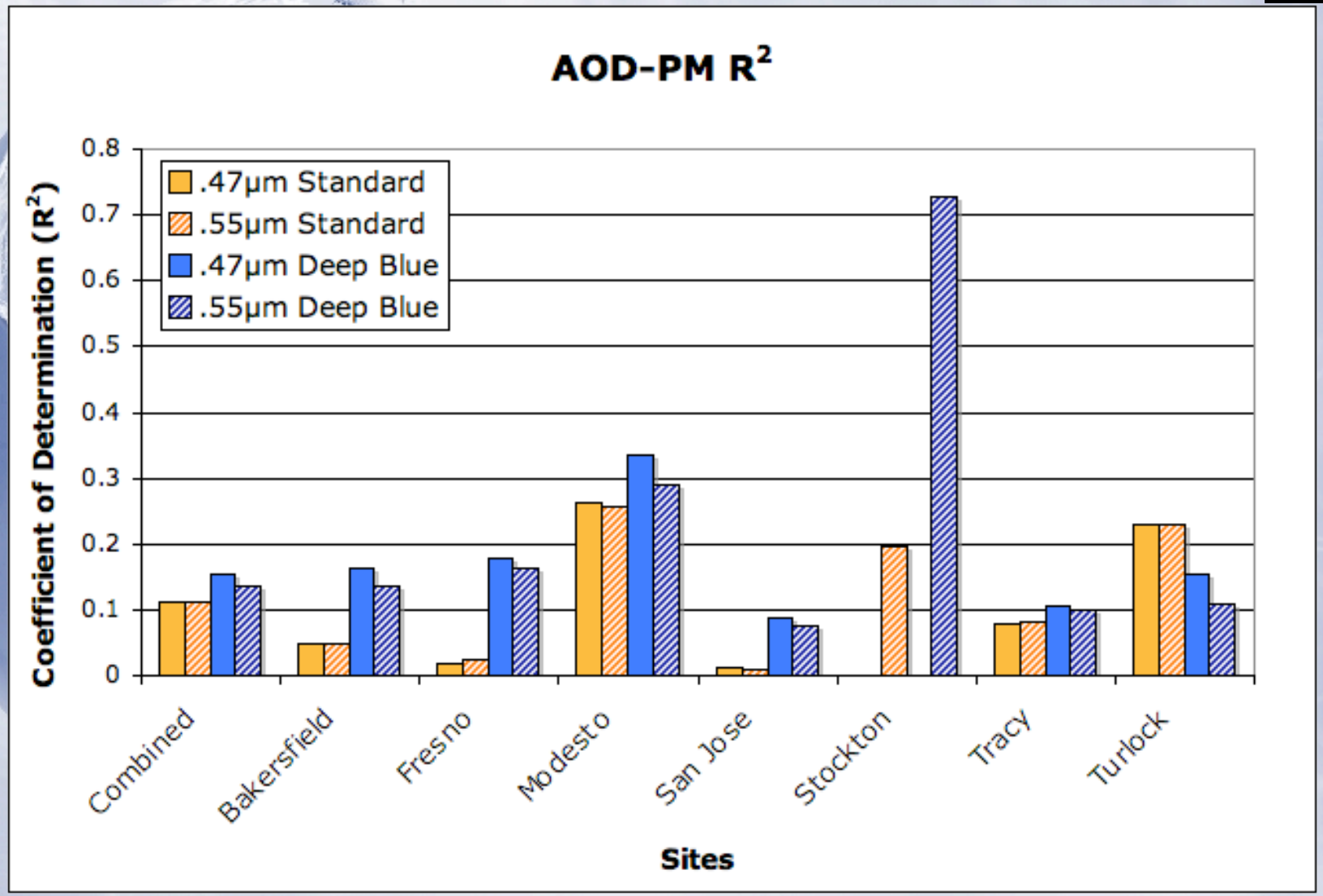
Field Sites

- Combined Sites
  - Bakersfield
  - Fresno
  - Modesto
  - Stockton
  - Tracy
  - Turlock
- Outside SJV
  - San Jose
  - Yosemite



A map of the San Joaquin Valley Air Pollution Control District in California, with our field sites.

Deep Blue vs. Traditional AOD



Conclusions

- Improved Correlations
- Enhanced Monitoring
- More Effective Regulation
- Cleaner Air
- Reduce Health Risk

Identification of West Nile Virus High Risk Zones

Problems

- Westward spread of West Nile Virus
- Cause of encephalitis/death among at-risk population

Goals

- Identify habitat of competent mosquito vectors
- Correlate vector habitat with vulnerable population
- Create a risk map for decision support purposes

Customers

- Monterey County Department of Health
- North Salinas Valley Mosquito Abatement District
- Monterey County Dept. of Information Technology

Public Health

Community Growth

Homeland Security

Project Advisers

- Dr. Jay Skiles
- Cynthia Schmidt, M.S.

Ames Research Center

- Krista Hanni, Epidemiologist
- Dennis Boranda, Biologist
- Darryl Tyler, GIS Analyst

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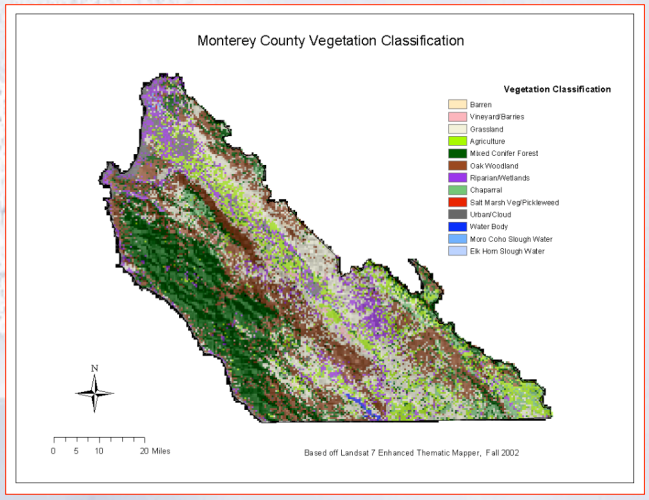
Del Norte
Siskiyou
Modoc
Humboldt
Trinity
Shasta
Lassen
Tehama
Plumas
Mendocino
Glenn
Butte
Sierra
Nevada
Lake
Colusa
Yuba
Placer
Sutter
El Dorado
Yolo
Sonoma
Napa
Sacto
Amador
Alpine
Solano
Calaveras
Marin
San Joaquin
Tuolumne
Mono
Contra Costa
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
San Benito
Fresno
Inyo
Monterey
Kings
Tulare
San Luis Obispo
Kern
San Bernardino
Santa Barbara
Ventura
Los Angeles
Orange
Riverside
San Diego
Imperial

Project Strategy

- Identify most likely regional mosquito vectors and vulnerable hosts
- Conduct fieldwork by sampling for mosquito larvae
- Conduct vegetation classification using satellite imagery
- GIS analysis resulting in a risk map



Show Monterey County WNV Fly Through

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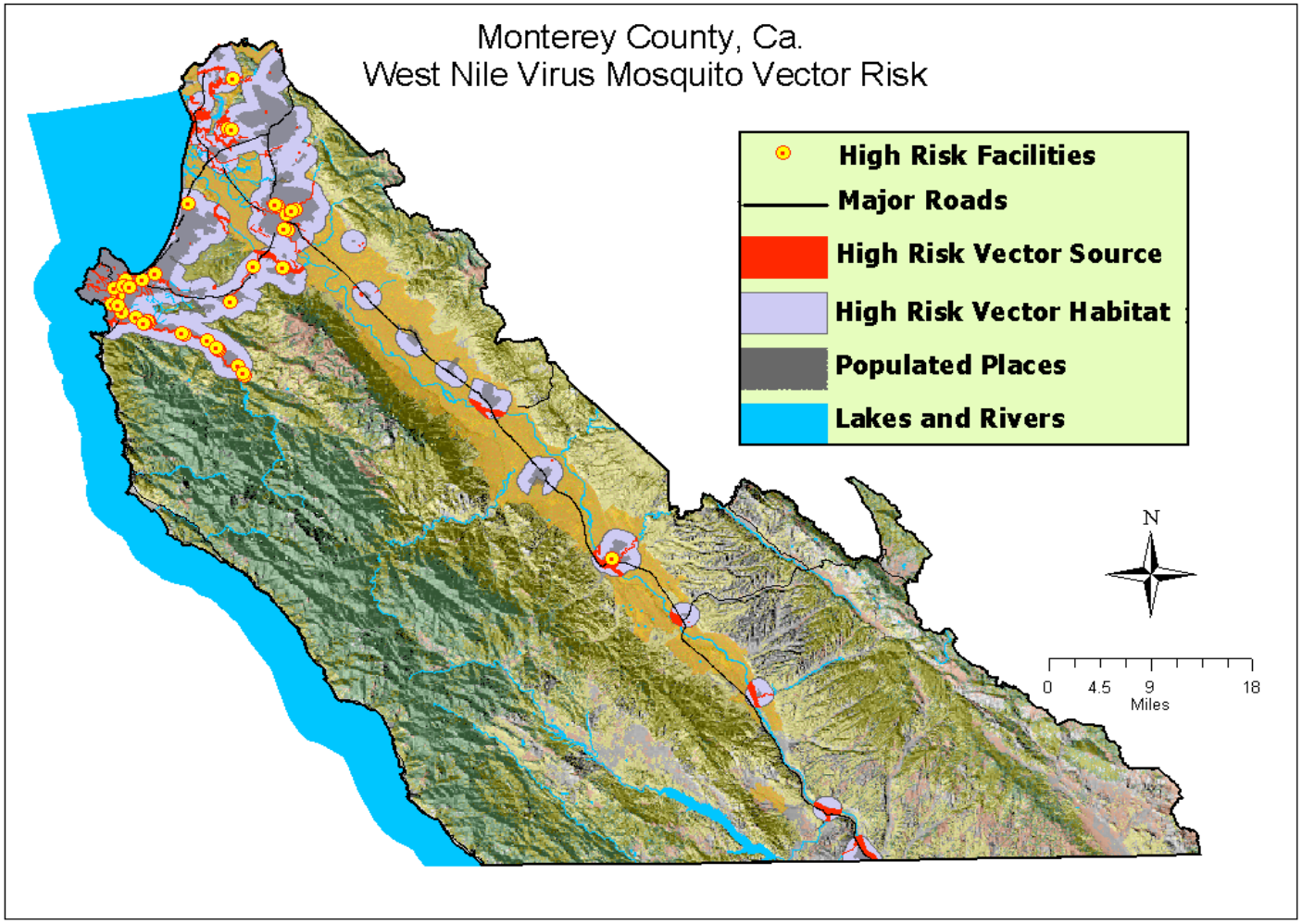
NASA



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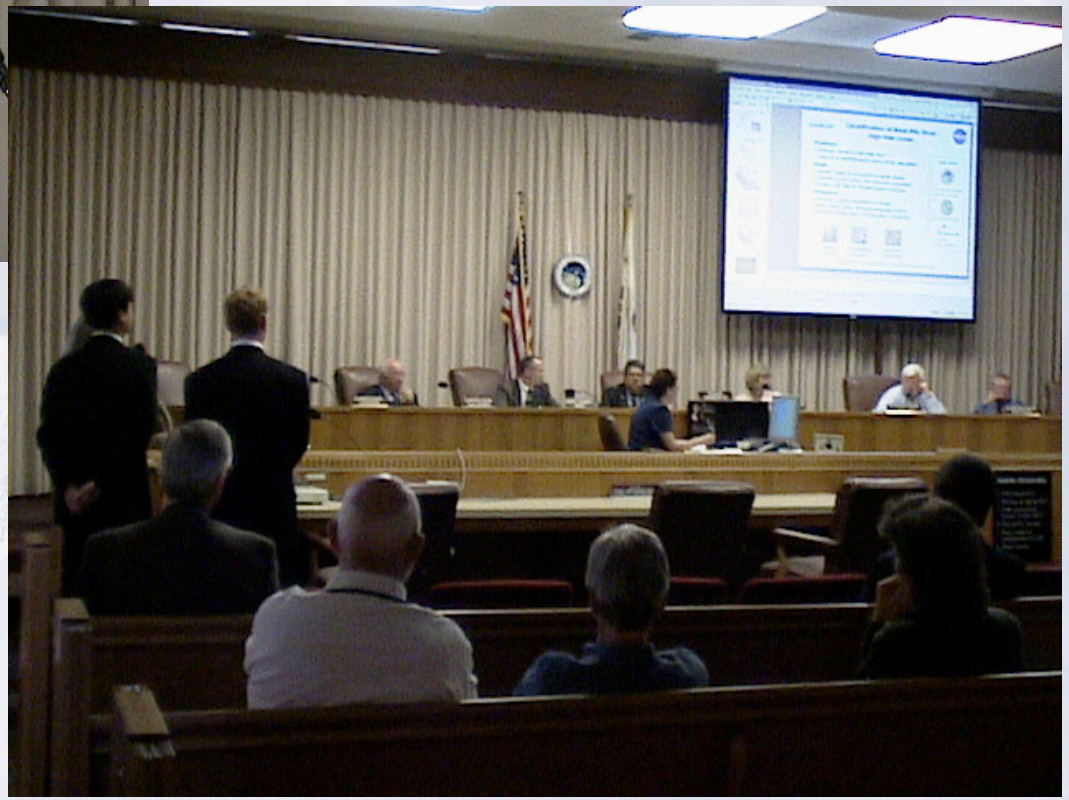
ARC DEVELOP Interns Present to the Monterey County Board of Supervisors



Ames Research Center

For more information….

2005

2006

Website: http://develop.larc.nasa.gov

Dr. Jay Skiles
NASA Ames Research Center
Joseph.W.Skiles@nasa.gov

2004

2003

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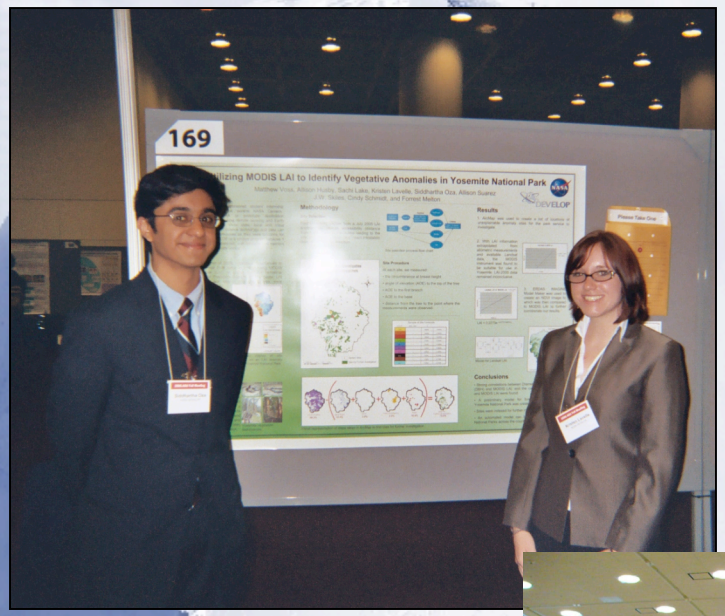
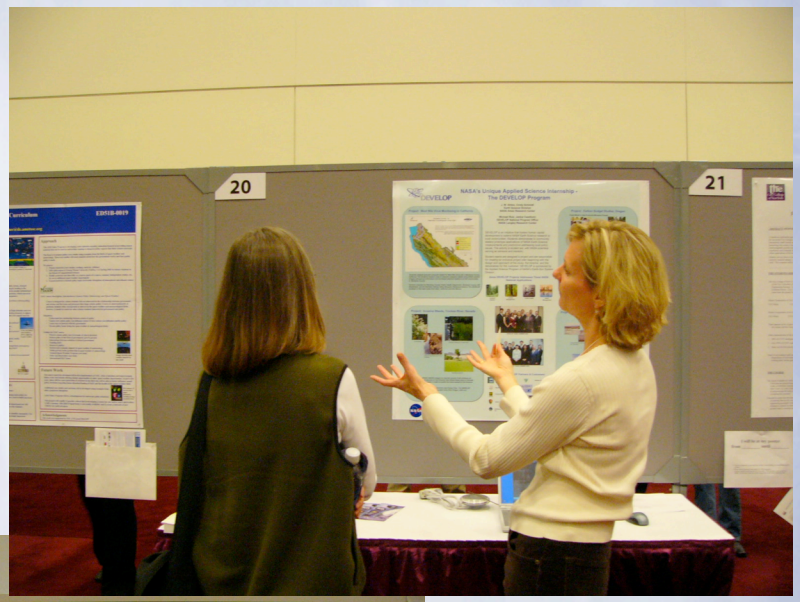
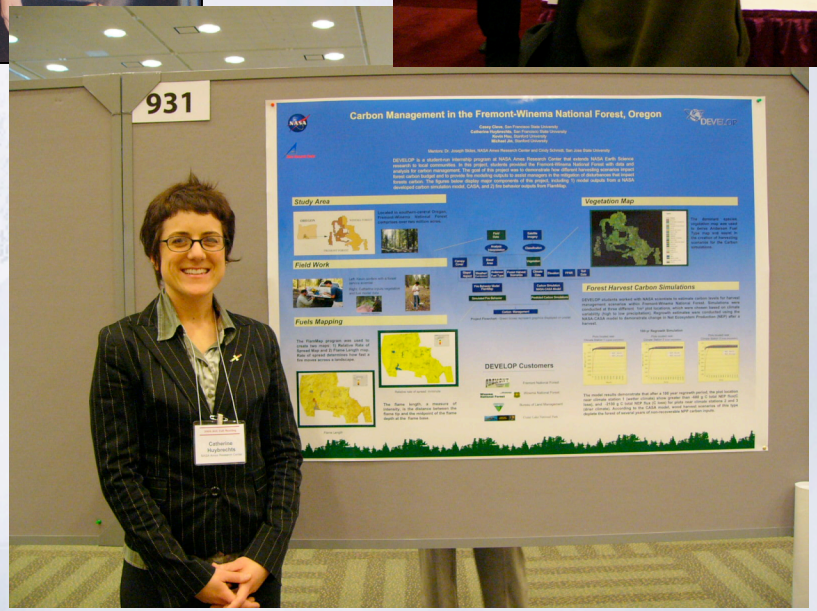
AGU Poster and Oral Presentations







2005 Western Governor's Association Meetings
Breckenridge, CO

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National Tribal Invasive Species Conference
Sparks, NV 2006

George Wright Society Meetings
St. Paul, MN 2007

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OOOPS!

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